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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Stig Sarkimukka

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03/03/2005

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EXAMINER

ARTMAN, THOMAS R

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/837,543

Applicant(s)

SARKIMUKKA ET AL.

Examiner

Thomas R. Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-9 and 11-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 11-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 9, 11-14 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (US 6,111,673) in view of Brede (US 6,603,822).

Regarding claims 1 and 9, Chang discloses an optical communication link and the method of transmission (col.4, lines 41-62), including:

1) a transmitting side and receiving side with high priority information being transmitted over a fiber link in a plurality of wavelength bands,

2) each band has different transmission characteristics that vary with time, such as polarization mode dispersion (PMD),

3) a first switch for transmitting high-priority information in a number of wavelength bands smaller than the total number of wavelength bands (col.4, lines 53-55), and

4) a controller connected to the first switch for selecting at each instant a wavelength band for transmitting the high priority information (switching to a "preferred path," col.4, lines 41-45).

Chang does not specifically disclose the method of switching in order to provide a sufficient total quality of the transmission or a quality-determining device connected at the receiving side for determining the quality. Chang teaches the routing of high priority information to a preferred path (different wavelength band, fiber link, or combination of both, col.4, lines 49-57, and Fig.2).

Brede discloses a communication system that sends high and low priority data signals over a set of channels (col.113, lines 56-67, and col.117, lines 40-45). Brede teaches the practice of switching higher priority data (avoiding channels) when overall quality of the channel deteriorates beyond a predetermined value, then uses the channel once the quality improves (col.72, lines 44-53, and col.114, lines 1-14). Brede further discloses a downstream quality monitor 900 for determining the quality of the channel and providing the controller (head end) with the necessary quality information (col.114, lines 12-29). In this way, data signal integrity can be maintained by switching the data signal to different channels as signal quality fluctuates.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the communication system of Chang to have a quality-determining device at the receiving side for determining the quality of a high-priority signal and to give the controller the necessary information for switching the signal to a different wavelength band such that a sufficient quality of the high-priority signal is maintained as taught by Brede for improved signal integrity.

With respect to claims 3, 11, 16 and 19, Chang specifically discloses that each end (node) of a transmission link has cross-connects to perform the necessary switching of the transmitted information (col.7, line 53, to col.8, line 3), where each switch has the necessary number of input and output ports for each band that the transmission link uses.

Further regarding claims 11 and 16, Chang's information originates as electrical signals (electrical layer 110). Additionally, it is standard in the art. Optical information signals begin and end at electro-optic devices in order to communicate with the standard all-electrical computer technology.

With respect to claims 4, 12, 17 and 20, Chang does not teach electrical switching.

Brede generally teaches electrical cross-connects, as are well known in the art and used in electrical telecommunication systems. One having ordinary skill in the art would contend that using electrical cross-connects to interface with an optical network provides a simple, cost-effective upgrade of existing communication systems.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Chang to perform the switching in the electrical domain. Switching in the electrical domain using existing electrical switches provides cost-effective upgrades for current communication networks.

With respect to claims 5, 13, 18 and 21, Chang performs the switching in the optical domain (optical layer 120).

With respect to claims 6 and 14, Chang's switch (Fig.4) is electro-optic and has selectable (tunable) delays, where the signals are then transmitted out of the switch.

With respect to claim 7, Chang teaches that the paths not used for the high priority signals are utilized for lower priority signals.

Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang and Brede, as applied to claims 1 and 9 above, in view of Roberts (US 5,949,560).

Regarding both claims, Chang and Brede do not specifically disclose the use of polarization mode dispersion (PMD) compensators.

Roberts teaches the use of adding PMD compensators arranged for each channel and connected at one end of a fiber link (col.10, lines 35-39) in order to compensate for the PMD in the signal. As is standard in the art, PMD compensators are used to improve the quality of a transmitted signal by essentially reversing the PMD experienced by a transmitted signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the combination of Chang and Brede to use a PMD compensator such that the quality of transmission is improved.

*Response to Arguments*

Applicant's arguments filed January 21<sup>st</sup>, 2005, have been fully considered but they are not persuasive.

First, Applicants assert that the examiner has misunderstood the secondary reference, Brede. This is true, in part. The examiner agrees that the reference does not teach optical switching between wavelength bands in a WDM communication system as previously asserted. However, it is clear from the rejection above that the exact operation of Brede is not relied upon. The primary reference, Chang, specifically performs all of the necessary functions in an optical WDM communication system as outlined in the above rejection. The only limitation that Chang is lacking (regarding the independent claims) is that the "preferred path" for a high priority signal is not clearly defined.

Brede specifically overcomes a problem that one skilled in the art would readily recognize exists in all communication systems, electrical and/or optical: that the quality of transmission of a signal changes over time and differs from one path (channel/wire/fiber) to the next. These are often caused by transitions from day to night, summer to winter, dry to humid, etc. Brede performs the same claimed method conceptually, where the quality of a channel is monitored downstream, and, when the quality of the transmission drops below a certain threshold, an upstream controller re-routes the data signal to a channel that is performing better. In this way, the overall quality of the transmission of that signal is improved.

In view of this evidence of record, it is understood by the examiner that one skilled in the art can readily apply these specific teachings of Brede to improve the overall quality of a transmitted signal regardless of whether the "path" is a different fiber/electrical wire or a

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different “channel”, “wavelength band”, etc. Chang already discloses the practice of switching data signals between wavelength bands and/or different physical paths (different fibers) to a “preferred path.” Brede defines a preferred path to be the one that is performing better at an instant in time during transmission of the signal for clear, obvious advantages.

Therefore, the teachings are clear from Brede that downstream quality monitoring and real-time switching of signals to higher quality paths improves the overall quality of the signal transmission. This concept is clearly, and equally, applicable to all transmission systems, regardless of what form the “path” takes and whether or not the communication system is electrical, optical or a hybrid of both.

Second, Applicants argue that, since the communication system of Brede operates differently, that is, it is an electric/optical hybrid system, that its teachings are incompatible with that of Chang. The examiner disagrees, at least for the reasons as discussed in the previous paragraphs regarding the obviousness of the prior art combination. Furthermore, the examiner wishes to remind Applicants that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).



Third, Applicants argue that the modification of Chang to perform electrical switching instead of the disclosed optical switching is detrimental to Chang and that there is no basis for such a teaching. Again, the examiner must respectfully disagree. Brede teaches the advantages of a hybrid electrical/optical system. Granted, electrical switching is slower than optical switching; however, it is very cost-effective to use electrical switching such that existing all-electrical systems are economically upgraded with optical fibers, and therefore realizing at least some of the advantages of optical communication systems until budgets permit for an all-optical network. Such backward compatibility, without the full realization of the potential of the technology is clear in all current communication systems, including all optical systems. All data signals today begin and end as electrical signals in order to interface with existing computer technology that operates solely in the electrical domain. Such compatibility and flexibility to interface with existing technology is therefore standard, since all-optical computers, etc., are quite rare. Because of that, the full advantages of optical switching have not been completely realized as yet in modern communication systems.

The compatibility and flexibility of using electrical switching, at least as suggested by Brede, has known advantages and precedence in the art, with reasonable expectations of success, and therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chang as stated in the rejections above.

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*Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner



DAVID V. BRUCE  
PRIMARY EXAMINER